

**REMARKS**

In the Office Action the Examiner noted that claims 1, 2, and 4 are pending in the application, and that claims 1, 2, and 4 are rejected. The Applicants respectfully submit, however, that claims 1-35 are pending in the application, and that claims 3 and 5-35 have been withdrawn from consideration. By this Amendment, claim 1 has been amended. No new matter has been presented. The Examiner's rejections are traversed below, and reconsideration of all rejected claims is respectfully requested.

**Restriction Requirement**

In items 2-7 on pages 2-3 of the Office Action the Examiner required restriction between Group I (including claims 1, 2, and 4) and Group II (including claim 35).

In response to this requirement, the Applicants elect Group I. Therefore, claim 35 of the present application is withdrawn from consideration.

**Claim Rejections Under 35 USC §102 or §103**

In item 13 on pages 5-7 of the Office Action the Examiner rejected claims 1, 2, and 4 under 35 U.S.C. §102(b) or §103(a) as allegedly being anticipated/rendered obvious by U.S. Patent Application Publication No. 2003/0016437, issued to Islam et al. (hereinafter referred to as "Islam"). The Applicants respectfully traverse the Examiner's rejections of these claims.

Islam discloses a process intended to improve noise performance for distributed Raman amplifiers through use of a multiple Raman order pumping scheme (Paragraph [0104]). A signal wavelength is pumped by a pump Raman order (nth Raman order), and the nth Raman order is amplified by a previous Raman order (n-1 Raman order). The nth Raman order is pumped so as to be counter-propagating to the transmitted signal, and the n-1 Raman order is pumped so as to be co-propagating with the transmitted signal. As the nth Raman order does not couple to the signal, the nth Raman order can be amplified closer to the input of one period of the amplifier length by the n-1 Raman order to improve the noise figure of the amplifier.

The Applicants respectfully submit that the features recited in claim 1 of the present application patentably distinguish over Islam on several points. Examples of some of the patentably distinguishable features recited in claim 1 are discussed below.

Claim 1 of the present application, as amended, recites “a first pumping light generating section that generates a plurality of pumping lights arranged at equal wavelength spacing in a first wavelength band which is shifted from a signal light wavelength band where said plurality of signal lights are arranged to a shorter wavelength side in accordance with the wavelength width corresponding to a Raman shift frequency.” Although the signal and the Raman orders in Figure 4 of Islam (cited by the Examiner) appear to be single values, rather than pluralities within respective wavelength bands, the Applicants will assume, as the Examiner apparently has, that they are wavelength bands centered approximately around the given wavelength values. In other words, it is assumed for the sake of these arguments that the signal represented in Figure 4 as having a wavelength of 1550nm is actually a wavelength band centered approximately around 1550nm, and that the nth Raman order is a wavelength band centered approximately around 1450nm, and so on. However, even with this assumption there is nothing to suggest an equal wavelength spacing of the pumping lights in the wavelength band of any of the Raman orders. This is in direct contrast with claim 1 of the present application, which recites the “pumping lights arranged at equal wavelength spacing in a first wavelength band.” Therefore, the Applicants respectfully submit that Islam does not disclose or suggest at least this feature of claim 1.

Further, claim 1 recites a second pumping light generating section that generates pumping lights, “the wavelength and power of which are set so that peak wavelength spacing of a Raman gain in the signal light wavelength band is substantially equal to each other.” Therefore, the pumping lights of the first pumping light generating section and the pumping lights of the second generating section are set so that the peak wavelength spacing of the Raman gain in the signal light wavelength band is substantially equal to each other. This is in direct contrast to the Raman order wavelengths exemplified in Figure 4 of Islam, the spacing between of which is apparently not substantially equal to each other. If the nth Raman order, the n-1 Raman order, and so on are to be considered as being the signal light wavelength band, as is recited in claim 1 of the present application, it is apparent from the listed wavelengths in Figure 4 that there is no substantially equal spacing between the Raman gains. Therefore, the Applicants respectfully submit that Islam also does not disclose or suggest at least this feature of claim 1.

Also, claim 1 recites “a multiplexing section that multiplexes the pumping lights generated respectively by said first and second pumping light generating sections to supply the multiplexed pumping light to said amplification medium.” The Examiner alleged that the multiplexers shown in Figure 4 of Islam can read on a multiplexing section. However, the Applicants respectfully submit that Figure 4 of Islam does not indicate any multiplexers whatsoever. There are merely

two different Raman pumps shown, which are physically located at a distance of 40-45 kilometers from one another (Paragraph [0105]). Therefore, as the Examiner has characterized the  $n$ th order Raman pump as the first pumping light generating section, and the  $n-1$  order Raman pump as the second pumping light generating section, the Applicants respectfully submit that it is apparent that the output of those two Raman pumps in Islam are not multiplexed to supply the multiplexed pumping light to the amplification medium. In fact, the  $n$ th Raman order is counter-propagating to the signal in Islam, while the  $n-1$  Raman order is co-propagating with the signal, which also shows that the two pumps are not multiplexed to supply the multiplexed pumping light to the amplification medium. Therefore, the Applicants respectfully submit that Islam also does not disclose or suggest at least this feature of claim 1.

Therefore, Islam does not disclose or suggest at least the features of claim 1 discussed above. Accordingly, Islam does not disclose every element of the Applicants' claim 1. In order for a reference to anticipate a claim, the reference must teach each and every element of the claim (MPEP §2131). Therefore, since Islam does not disclose the features recited in independent claim 1, as stated above, it is respectfully submitted that claim 1 patentably distinguishes over Islam, and withdrawal of the §102(b) rejection is earnestly and respectfully solicited.

Further, as the Examiner has only provided a §103 rejection regarding the multiplexing of the pumping lights, and not the other discussed features which are patentably distinguishable over Islam, the Applicants respectfully submit that a proper §103 rejection cannot be made based upon Islam.

Also, regarding the Examiner's §103 rejections based on Islam, the Examiner alleged that the co/counter pumping mechanism in Figures 36 and 37, and described in Paragraphs [0187]-[0189], render the multiplexing of the pumping lights obvious. However, the Applicants respectfully submit that the combiner 3660 is merely combining the output of two identical 1395nm laser diodes (Paragraph [0188]). Therefore, there is no multiplexing of pumping lights generated by two different pumping light generating sections, the pumping lights being of different wavelengths, as is recited in claim 1 of the present application. Thus, there would be no motivation to use the combiner 3660 of Islam in the Raman amplifier recited in claim 1. In fact, as the combiner 3660 is merely combining two identical wavelength signals, the Applicants respectfully submit that the mechanism disclosed in Islam is not satisfactory for the intended purpose of the Raman amplifier recited in claim 1. MPEP §2143.01 states if the proposed modification would render the prior art invention being modified unsatisfactory for its intended

purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

Therefore, the Applicants respectfully submit that claim 1 of the present application patentably distinguishes over Islam, and further respectfully requests that the Examiner withdraw the §102 and §103 rejections of this claim.

Claims 2 and 4 depend from claim 1 and include all of the features of that claim plus additional features which are not disclosed or suggested in Islam. Therefore, it is respectfully submitted that claims 2 and 4 also patentably distinguish over Islam.

#### Summary

In accordance with the foregoing, claim 1 has been amended. No new matter has been presented. Thus, claims 1-35 remain pending in the application, although claims 3 and 5-35 have been withdrawn from consideration.

There being no further outstanding objections or rejections, it is respectfully submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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12/27/06

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